# **SECRET UNIVERSE**











## A unique and universal Ion Source that revolutionizes mass spectrometry across applications.

SICRIT<sup>®</sup> – Soft Ionization by Chemical Reaction In Transfer – is an ambient, flow-through ionization technique for mass spectrometers with atmospheric pressure inlet (LC-MS).



#### **Conventional ionization**



It is fundamentally different to conventional ionization methods: In almost all conventional ionization methods like ESI, DART, DESI or APCI, the analyte gets ionized before being introduced into the MS.





### **SICRIT®** ionization



The patented SICRIT<sup>®</sup> Ion Source extends the inlet of the MS and ionizes all molecules that are drawn into the system due to the prevailing vacuum by means of a specially shaped cold plasma.

The plasma is generated by a special form of dielectric barrier discharge (DBDI) and takes place inside the extended inlet capillary.





## **Increased sensitivity**

The ionization within a closed chamber in extension of the inlet prevents columbic repulsion before the inlet and enables higher sensitivities.

## **Enhanced range of analytes**

Three simultaneous ionization mechanisms expand the range of detectable analytes, covering polar and non-polar components.

### No fragmentation

The unique shape of the cold plasma enables a soft ionization of analytes and avoids fragmentation.

### **One for all**

The SICRIT<sup>®</sup> Ion Source is available for all current LC-MS systems of all vendors.













#### No sample preparation

The ambient character of the ionization source allows to analyze solid, liquid, or gaseous samples in room air without sample preparation (direct screening).



### **Flexible coupling**

SICRIT<sup>®</sup> is the only technique that provides a seamless coupling with all chromatography methods like GC, LC and SFC.



#### Low operation costs

SICRIT<sup>®</sup> does not require Helium or other noble gases for operation, it runs with ambient air and electrical power.



#### **Easy installation & operation**

Plug & play ion source that does neither require calibration nor adaptions on hardware, software, or workflow.

# CATIONS



**LC-MS** analysis

The SICRIT<sup>®</sup> Ion Source enables the coupling of any (LC-)MS with any kind of chromatography like GC, LC or SFC, without being limited to a specific combination of vendors.



The SICRIT<sup>®</sup> Ion Source enables direct MS-analysis of solid, liquid or gaseous samples in a quantitative manner even without chromatography.

#### **Imaging MS analysis**

The SICRIT<sup>®</sup> Ion Source enables MS imaging solutions with cutting edge resolution based on laser desorption or as post ionization device for MALDI.

## **GRAPHY**

Gas Chromatography (GC) combined with atmospheric-pressure-inlet mass spectrometry (LC-MS)

> The SICRIT® Ion Source enables to combine the advantages from GC (highest separation power) and (LC-)MS (soft ionization and higher sensitivity) in one superior solution.





## Liquid Chromatography (LC) or supercritical fluid chromatography (SFC) interfaced with mass spectrometry

The SICRIT<sup>®</sup> Ion Source enables the interfacing of LC and SFC offering cleaner spectra (less adducts, soft ionization) higher salt tolerance, universal solvent compatibility and broader coverage of ionization.





## Gas Chromatography (GC) combined with atmospheric-pressure-inlet mass spectrometry (LC-MS)

## Enabling a unique range of applications

Separation and soft ionization of n-Alkanes for determination of molecular weights.



#### #Alkanes



Soft ionization of PCBs forms [M]<sup>+</sup> ions to identify and validate components based on their isotopic pattern.

Sensitive quantification of Nitrosamines by GC-SICRIT<sup>®</sup>-MS based on individual LC-MS MRM transitions.

Compound	Abbreviation	LOD [ng/mL]
N-Nitrosodimethylamine	NDMA	1.2
Diethylnitrosoamine	NDEA	0.1
N-Nitroso-N- methylethylamine	NMEA	0.1
N-Nitrosodipropylamine	NDPA	0.4
N-Nitrosopyrrolidine	NDBA	0.1
1-Nitrosopyrrolidine	NPYR	0.4
1-Nitrosopiperidine	NPIP	0.5

#### #PCBs

-		Note	
Soft ionization GC-HRMS of I	Polychlorina	ted	
Biphenyls (PCBs)			
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#### **#Nitrosamines**



#### More information on our website

Want to see more details and additional applications? Visit www.plasmion.com





## Liquid Chromatography (LC) combined with atmospheric-pressure-inlet mass spectrometry (LC-MS)

## Providing cleaner spectra and unique analysis capabilities

### Soft ionization of compounds without sodium or potassium adducts.



Detection of perfluorinated Alkanes (not accessible by ESI, APCI or APPI). Routine detection of Pesticides with superior tolerance for salts, solvents and matrix.





#### #Nitrosamines



#### More information on our website

Want to see more details and additional applications? Visit www.plasmion.com



## DIRECT NS





The SICRIT<sup>®</sup> Ion Source in combination with the GC/SPME-module enables thermal desorption of SPME fibers for a direct and quantitative analysis of solid samples.



## Direct analysis of liquid samplesDirect analysis of gas samplesvia vaporizationvia direct injection

The SICRIT<sup>®</sup> Ion Source in combination with the GC/SPME-module enables vaporization and quantitative analysis of liquid samples.

Industrial VOC sensor for automated decision making based on direct MS analysis.





th	The SICRIT <sup>®</sup> Ion Source in combination
n	with the GC/SPME-module enables
-	direct quantitative headspace
	measurements of gaseous samples.

Direct MS-based breath analysis.



## **Direct quantitative MS analysis of solid samples**

## Fast, easy, no sample prepraration

Parallel desorption of pesticides from SPME fibers analyzing soil samples.



Simultaneous detection due to soft ionization with minimal to no fragmentation.

Fully quantitative results without chromatography.



#### **#SPME**



#### #Thermal desorption



#### More information on our website

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0,3



## **Direct quantitative MS analysis of liquid samples**

## Reproducible & quantitative without chromatography

50 direct injections of Alkylamines mix in 30 minutes with RSDs < 5%



Direct liquid measurement for determination of OMEs in biofuels.

Difficult to ionize molecules easily analyzed with SICRIT by direct liquid injection.





No CN loss, (M+H)



(M+H

No CN loss, (M+H)

#### #Explosives



#### #CWA



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## **Direct headspace & gas phase analysis**

## Measure & quantify samples and processes in real-time

Parallel online-monitoring of 500+ aroma compounds during coffee roasting.



Analysis of aroma fingerprints and off-flavors or contaminations.

Headspace HRMS analysis of PFCAs in coating powder formulation.





#### **#PFCA**

Fast and Direct Detection of	Perfluorocarbo	acids	
(PFCA) with SICRIT®-MS			
Burnmany 4 IDPTP MS allows for direct PFCA screening of any solid sample (ormslation preview, textile sampling or commy solitons 40 sample pri-methanic reconstary 4 Solit location in registrie mode 1 Sign resultion W6 data for non-insignt analytics	The EXCRET* los yource can instrument, transforming it to samples can be analyzed by of interest in host of the MS	be adapted to every LC-MS r an celline sample, where simply holding the sample inter	
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SECRUP conclution prepares a versatile approach to Spoens This cleanical workflow!	Diffuent samples were analyted for PPCA compounds with SIGNTP Parama settings: 13.4V, 34.940, Therefore, the treating-or of could parallel formations with directly measured out of plantic large teer Plane 5, Analyte iterationics was performed using Thereio Roalitour Software and a confidence window of 5 ppm.		

#### #Coffee



#### More information on our website

Want to see more details and additional applications? Visit www.plasmion.com



 $C_8F_{15}O_2$ 



## Enabling biomarker discovery & metabolism monitoring

Non-invasive sampling of patient's breath for volatolom analysis in real-time.







## **Direct MS-based breath analysis**

Patient profiling based on VOC patterns and dedicated data evaluation tools.



Target/non-target Biomarker identification based on exact molecular mass.

155.10692

 $C_{9}H_{15}O_{2}$ 

4-Hydroxy-2,6-nonadienal

2

90 -

## More information on our website

154.8

155.0

m / z

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154.6

#### #Breath





155.2

![](_page_13_Figure_1.jpeg)

## HaVoc<sup>®</sup> – a simple but powerful sensory system for automated in-line quality monitoring of aroma and VOC

The HaVoc enables the use of laboratory grade MS-Systems as automated VOC sensors in an industrial environment. It serves the Industry 4.0 demand of highly sensitive but easy to use real-time sensors. Up to now, in-line process control at laboratory grade was simply not affordable due to high instrumental and human effort in sample preparation. The HaVoc system now provides an affordable automated "lab in a box" sensor solution for almost any chemical analysis in industry.

#### **Simplicity**

Customizable and easy to use software workflow ensures acceptance amongst users

#### **Flexibility**

Extendable inlet enables to access also difficult sampling spots

#### **Mobility**

Wheels combined with lightweight chassis ensure mobility

![](_page_13_Figure_10.jpeg)

![](_page_13_Figure_11.jpeg)

## **Imaging MS**

Analysis The SICRIT<sup>®</sup> Ion Source in combination with a laser ablation setup or as post-ionization device for (AP-)MALDI enables MS imaging down to 5µm.

![](_page_14_Figure_3.jpeg)

![](_page_14_Picture_4.jpeg)

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![](_page_15_Figure_1.jpeg)

## **Imaging MS analysis**

## Post-ionization in AP-MALDI imaging

![](_page_15_Figure_5.jpeg)

![](_page_15_Picture_7.jpeg)

![](_page_15_Figure_9.jpeg)

![](_page_15_Picture_11.jpeg)

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The ease with which the SICRIT<sup>®</sup> device can be installed and the minimal need for optimization presents this commercially available tool as an attractive method for simple post-ionization for any AP-MALDI MS imaging.

Elia, E.A. et al, Anal. Chem. 2020, 92, 15285-15290

![](_page_15_Figure_15.jpeg)

![](_page_15_Figure_16.jpeg)

![](_page_16_Figure_1.jpeg)

## **Imaging MS analysis**

## High-Resolution laser ablation imaging of different surfaces

Mass spectrometer

![](_page_16_Figure_4.jpeg)

![](_page_16_Figure_5.jpeg)

The combination of fast washout UV-laser ablation with the principle of the flow-through SICRIT<sup>®</sup> Ion Source allowed for highly efficient soft ionization as well as high spatial resolution down to 10 µm.

![](_page_16_Figure_7.jpeg)

![](_page_16_Figure_8.jpeg)

### "

The SICRIT<sup>®</sup> source can be hyphenated to any commercial laser ablation system and nearly any API mass spectrometer that is commercially available. This makes this technique easy to adapt to individual needs regarding the sample type and analytical question.

Funke, S.K.I. et al., Anal. Chim. Acta 2021, 1177, 338770

onizatio

SICRIT®

![](_page_16_Figure_13.jpeg)

![](_page_16_Figure_14.jpeg)

![](_page_16_Figure_15.jpeg)

## Plasmion's vision is to simplify mass spectrometer based analysis to make it more efficient and accessible for everybody.

Plasmion not only provides innovative solutions that simplify and improve classical MS-based analysis in Labs. It also pushes beyond existing borders by leveraging mass spectrometry as one of the most powerful chemical analysis techniques to enable real-time, Lab-grade analysis even in challenging industrial environments.

Want more information? Visit us at <u>www.plasmion.com</u> or follow us on <u>LinkedIn</u>

![](_page_17_Picture_4.jpeg)

![](_page_17_Picture_5.jpeg)

![](_page_17_Picture_6.jpeg)